JUDGING LAND
for
SOIL CONSERVATION

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FOREWORD

Farmers and students can judge land just as they judge cows, chickens and grain. Land and soil conservation judging contests are being held throughout the Midwest.

Because of this growing interest and the demand by teachers and agricultural leaders for help this booklet is being prepared. Land judging is the newest of judging contests. The experience gained from the judging events already held may help those who have not yet conducted such activities.

This increased interest in land judging indicates that teachers, agricultural leaders, and farms boys are aware of the importance of land as the basis for all agricultural activities.

This desire to know more about land presents an opportunity to help people understand the basic differences in land. The young men will soon be farmers themselves. If they are to become conservation farmers they will need to know why some land can do things that other land cannot do. They need to understand that the use that should be made of a piece of land is determined largely by the way Mother Nature made it and that many of the inherent land features cannot be changed appreciably. They need to know that the physical features of land may be an asset or a liability; that a farmer must learn to take advantage of the assets and either overcome the liabilities or learn to live with them.

It takes many years of training and experience for a man to learn to map and classify land. To try to cover all the details of this subject is not the intent of this booklet nor could such a volume of material be handled properly in such a booklet. However, students of agriculture need not become soil technicians in order to know how to farm and conserve soil and water. By learning to recognize some of the major land features, and by studying the important conservation methods, these farm boys will understand what conservation farming means. They will know better than to try to use land for purposes to which it is not suited and they will know when they need help and where to get the assistance they need for planning and applying a conservation farm plan.

It is becoming more and more recognized that soil conservation is not just something that would be nice to have — it is a matter of life or death to the people of the nation and a matter of profit or loss to the farmer. Using land according to the way Nature made it and applying conservation measures according to the needs of the land have been found to be the basic principles of conservation farming and are so recognized by agricultural leaders and by conservation farmers.

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By HAROLD E. GROGGER and ALBERT B. FOSTER

THE IMPORTANT LAND FEATURES

More people are interested in soil conservation now than ever before. People have realized that land can be destroyed — if properly cared for it means better living for the farmer; if not properly cared for it gets poorer and poorer until it can no longer produce the food and fiber the country needs.

Conservation work on farms during the last 10 to 15 years has convinced farmers, research workers and soil conservation specialists that an **understanding of the land itself** is needed before a soil conservation program can be planned. A lot has been learned about the soil during the relatively short period it has been studied but there is much yet to be learned.

This need for an understanding is recognized by the Soil Conservation Service, by the soil conservation districts with which the Service works, and the thousands of farmers who have cooperated in planning conservation programs on their farms. The question of what land information is needed to make a sound soil conservation plan for a farm arose early in the conservation movement. Much time and effort have been given to finding a reasonable answer to this question. Many field studies by research workers and meetings with farmers and technicians were devoted to finding out what land information is needed.

Gradually the answers are being found. Six major physical land features described in this booklet constitute the primary basis for the type of land capability inventory the Soil Conservation Service uses in its work at the present time with soil conservation districts and cooperating farmers. These six major features are not all-inclusive but if they are understood by farmers — the people who are actually going to conserve our soil — there is good reason to believe the conservation job will be done well.

If this is true, then it seems reasonable to recommend also that these land features be used as the basis for land judging by the future farmers who eventually will be in charge of the land.

Knowledge of the following six features will help provide a better understanding of the land:

Color of surface soil.

Depth of the soil material favorable for the feeding zone of plant roots.

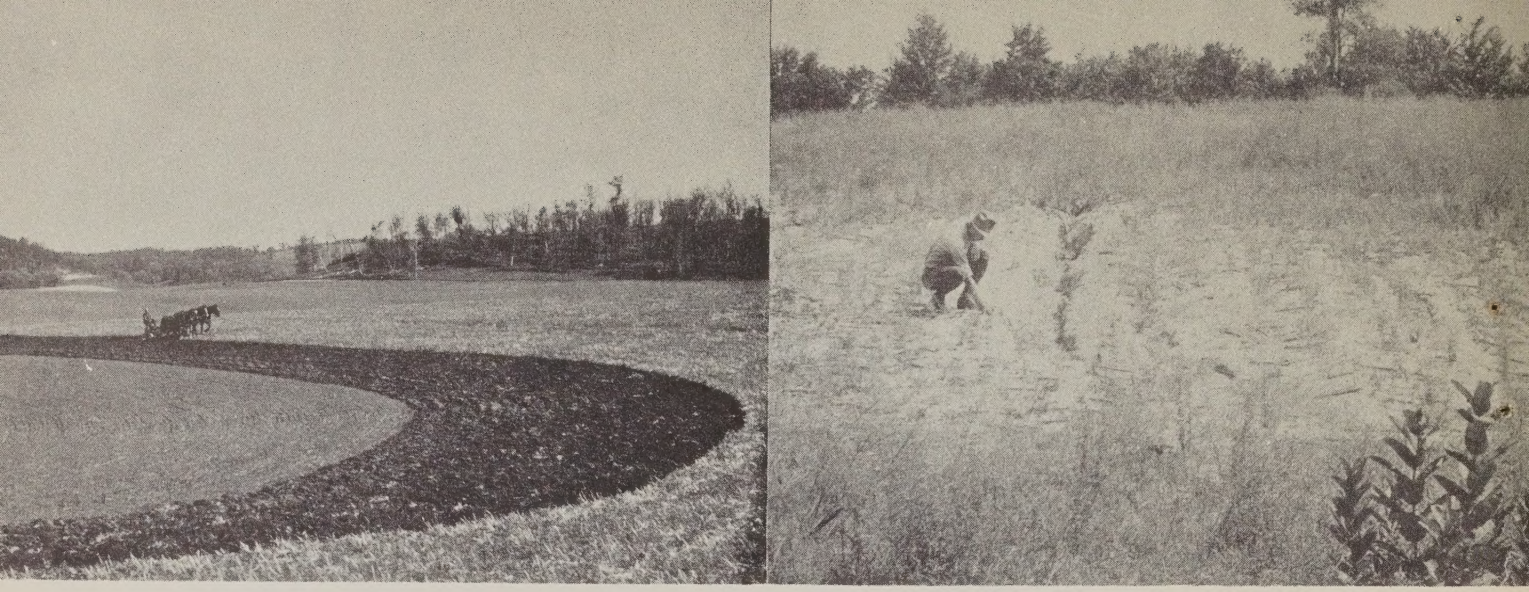
Air and water movement.

Texture of the surface soil.

Slope of the land.

Depth of the surface soil (extent of erosion).

A discussion of each follows:



Soil color is an important clue to productivity. Dark soils usually, though not always, indicate higher inherent fertility.

Color of Surface Soil

A dark surface color indicates that over the past years much living matter has grown on the land and has been returned to the soil in the form of organic matter. Such soils originally had good surface tilth and an adequate supply of organic matter and plant nutrients.

The color of the surface soil then is one of the clues left by Mother Nature that helps us determine the inherent fertility of the soil. A field may have been abused by past misuse and as a result the present fertility may not be equal to the inherent or native fertility. But the color of the surface will give a good indication of how a soil produced in the past and an indication of needed treatment to assure future production.

In judging soil color these three categories are suggested:

Dark — This includes the black and dark brown colored surface soils which usually indicate a relatively high inherent fertility.

Moderately Dark — This includes the dark gray, grayish brown and the light brown surface soils indicating a moderate inherent fertility level.

Light — This includes the brownish-gray, gray, or light gray surface soils and indicates a low or very low inherent fertility level.

Surface soil color can be determined merely by looking at a handful of the soil when it is moist.

Heavy cropping in the past may have depleted the available supply of plant nutrients to a low level. Unfortunately we cannot determine the present level of plant nutrients by merely looking at or feeling the soil. After judging the land's inherent fertility by noting the color, soil tests will help in planning a conservation program by indicating what kind and how much fertilizer to apply.

Depth of Soil Material

Depth of soil material refers to the combined depth of surface soil and subsoil where the plant roots can live and do well in their job of getting food and water for the plant.

Under the climatic conditions of the Upper Mississippi River Region of the United States 36 to 40 inches of soil material, of favorable texture and structure, has been found to provide sufficient food and water storage capacity for the growth of adapted crops. Soils of lesser depth will usually be lacking in food and water storage capacities.

Presence of any layer in the soil which severely restricts or prevents thrifty root development and growth at less than 36 inches will limit the effective depth of a soil. Common restrictive layers are rock layers; dense chert layers; sand or gravel layers; hardpan, claypan, or siltpan layers.

These two pictures illustrate the differences that may occur in soil depth. A restricting layer, such as rock, less than 36 inches deep, is a handicap to most plants.

Three classes of soil depth are suggested:

Deep — If the combined thickness of the favorable surface soil and subsoil is 36 inches or greater in depth.

Moderately Deep — If the presence of a limiting or restrictive layer occurs within 20 to 36 inches of the top of the soil.

Shallow — If the presence of a limiting or restrictive layer occurs at 20 inches or less in the soil.

Soil depth can be judged by digging in the soil with a soil auger or spade or by observing road cuts or gully banks to determine the presence of any limiting layers. Soil depth determines the area which is favorable for the storage of plant food or water. For example, research investigations have indicated that a 12-inch layer of favorable soil material such as a silt loam or loam will hold about 2 inches of water. Additional studies indicate that a normal crop, such as corn large enough to shade the ground, in July and August will require about an inch of water per week. A loam soil only 18 inches deep would hold about 3 inches of water. This would, under average conditions, furnish moisture for the plant for only a 3-week period. If sufficient rain did not fall and enter the soil in this time the plant would shrivel and fail to grow.

Soil depth also is important in seedbed preparation, construction of terraces and ponds, and affects the kind of crops that can be grown.

Air and Water Movement in the Soil

A soil, to have favorable air and water relationships must be able to take up water readily during periods of rain and dry out or warm up readily when the rain is over. It must hold ample moisture to supply the needs of the crop between rains and yet permit water to pass through the soil and prevent water logging and excess moisture. A soil with favorable air and water relationship, with a reasonable amount and distribution of rain, will not stay too wet nor become too dry.

This relationship or exchange of air and water in the soil is known as the air and water movement. It has great effect on the kind of crops that can be grown, how soon the soil can be worked, benefits that can be expected from fertilizers and the delivery of food and water to the plant by the plant roots during periods of wetness and dryness.

The air and water behavior in soils in influenced by many things, some of which are the texture and structure of the soil, the degree of density or porosity of the soil, and the thickness of the various layers.

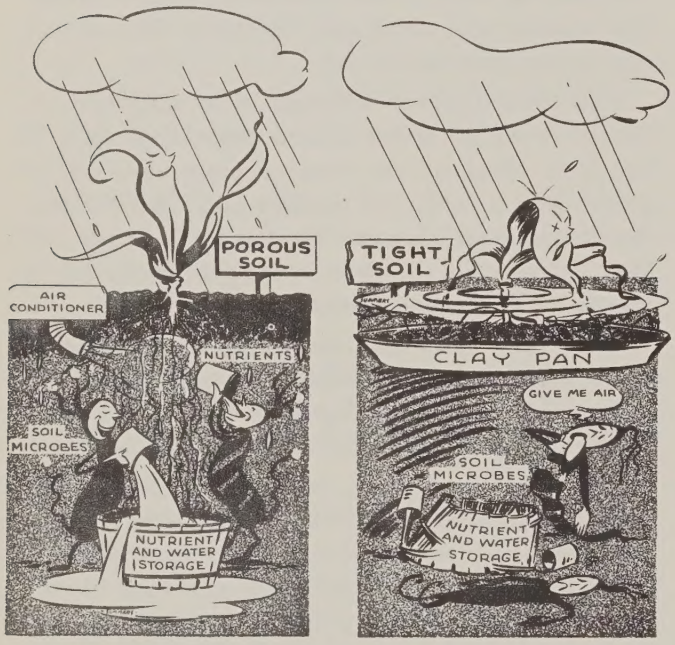
One of the best clues, however, to soil, air and water relationship is the **color of the subsoil.** Just as a plow share will oxidize or rust when exposed to intermittent wetting and drying so will a soil oxidize under favorable air and water movements. A soil having a moderate air and water behavior has good aeration yet ample moisture for favorable chemical reaction. A well oxidized soil has bright colors of red, yellow or brown in the subsoil. A soil with too much water and not enough air will not oxidize well and the colors will be dull or gray and frequently mixed or mottled colors of gray, black, yellow and brown will occur.

For general purposes of judging land, all soils can be grouped into one of the following air and water behavior conditions:

Rapid (which may be subdivided into moderately rapid, rapid, or very rapid in some areas) — This means that water and air movement is slightly faster than is desirable. Water moves through the soil too fast and the soil does not hold enough moisture for the most favorable soil functions. Air

will replace the water and the soil will be droughty. These soils normally will allow at least 2.5 inches of water to pass through them in one hour. Oxidation will have been very thorough under this condition and subsoil colors will be bright even though air and water movement is too rapid for best soil functioning.

Moderate — This is the most favorable condition of air and water behavior — just right for normal soil functions. The soil allows an exchange and movement of air and water which is neither too great nor too little. This permits adequate passage of water for quick warming-up of the soil, yet the soil retains enough moisture to withstand reasonable periods with no rain. Moderate water movement is considered to be between .8 and 2.5 inches per hour. This soil has a well oxidized subsoil as indicated by a bright color such as red, yellow, or brown throughout the subsoil.



Moderately Slow — Water moves through the soil just a little slower than is desirable for best results. The soil holds enough moisture normally for most soil functions but is inclined to be slightly wet and cold natured in the damp spring seasons or following periods of heavy rainfall. Moderately slow water movement is measured between .2 and .8 inches per hour.

The subsoil in this case is less well oxidized and the colors will be bright in the upper part with dull gray or mixed colors usually accompanied by heavier texture in the lower subsoil.

Slow — In this case water and air move through the soil at a slow rate and the soil remains quite wet following the rainy periods and dries out rather slowly. Timely seasonable operations are often delayed and the most favorable plant growth may be delayed because of the wetness and cold nature of the soil. Slow water movement is between .05 and .2 inches per hour.

This condition is characterized by dull gray or mixed and mottled dull colors throughout all the subsoil.

Very Slow — In this case the water movement is so very slow that sufficient air cannot get into the soil and it remains wet and water-logged for rather lengthy periods. Such soils are not well adapted to some crops and normally remain wet in the wet seasons. They store insufficient available moisture for the plant and are droughty in dry periods. Water movement in these soils generally is less than .05 inches per hour.

Soils of this kind have gray color in the lower part of the surface soil — often called a gray layer —and the subsoil is dull gray, mottled and usually very heavy.

It is well to keep in mind that poor oxidation and gray colors reflect the natural air and water condition in a soil before any drainage may have been done. If such soils can be drained the air and water movement will be improved quickly but subsoil colors change very slowly. Therefore, the determination of air and water behavior in soils that have been drained can be judged more accurately by a careful study of subsoil structure and texture rather than by color.

Texture of the Surface Soil

Texture of the surface soil refers to the size of the soil particles. This is important in its influence on a soil's ability to take up moisture, to dry out, the ease of tillage, and the favorability of the seedbed—where the baby plant must start its growth. For purposes of judging land the surface soil texture is divided into four general categories. (Some additional ones may be necessary in some soil areas.)

Medium — A good favorable mixture of sand, silt and clay, neither too heavy nor too light. (Usually a loam or a silt loam.)

Light — A surface texture that is a little too sandy. It does not hold moisture well and is subject to rapid temperature changes. (Usually a sandy loam or very fine sand.)

Heavy — A surface texture with so much clay in the surface soil that it is sticky and gumbo-like. It often is too wet to work and remains hard and cloddy when dry. (Usually a clay or silty clay.)

Very Light — A texture that is very sandy and coarse and will not hold together. Such a soil cannot hold sufficient water or plant food and is subject to blowing. (Usually a sand or coarse sand.)

Surface texture can be determined by rubbing a portion of the surface soil between the fingers. If it is smooth and fluffy, holds together well but breaks up easily without too much coarse sand present it has medium texture.

A light textured soil feels gritty and has considerable sand present, falls apart readily and can be pressed into a firm ball only with difficulty.

A heavy textured soil feels sticky and heavy, ribbons out between the fingers like toothpaste when wet or breaks into small cubes when dry.

A very light textured soil is very coarse and gritty and the individual particles of sand can be easily seen; it will not bind together into a ball when pressed or does not dirty the fingers when rubbed between them.

The four features just described — color, depth, air and water behavior and texture — are internal characteristics within the soil, but there are two **land** features that occur on every field of every farm that should not be overlooked. These two additional features are: slope of the land and erosion of the topsoil.

Slope of the Land

This refers to the lay of the land or the topography of a field. The slope is important because it has great influence on the speed with which water runs off a field and the amount of soil that washes off with the water. Slope also affects the use of farm machinery. Some fields are so steep that cultivation is impossible even though the soil is excellent.

For judging the slope of the land the following divisions may be used:

Nearly Level — Land that is flat or very nearly so and has very little slope — usually less than two feet fall for every 100 foot horizontal distance.

Gently Sloping — Land that slopes very gently and usually has no abrupt changes — usually 3 or 4 feet fall per 100 foot distance.

Moderately Sloping — Land that has considerable slope and usually some irregularity — normally 7 to 8 feet fall per 100 foot distance.

Strongly Sloping — Lands with slopes that are quite strong usually with considerable irregularity — about 14 to 15 feet fall to each 100 feet.

Steep — Land that breaks sharply and has steep slopes — usually around 18 to 20 feet fall in 100 feet of distance.

Very Steep — Land that slopes very abruptly and is very steep — around 25 to 35 feet fall, or more, in each 100 foot distance.

Judging the percentage of slope comes only with much experience, but using a farm level to determine the feet fall and then pacing off the distance will aid in learning to judge slope.

Slope presents a hazard that is hard to overcome and must be lived with. Regardless of the productivity of the soil a steep slope can limit the use of a field.

Erosion of the Topsoil

The topsoil, like the cream that occurs on a bottle of milk, is generally the richest part of the soil. When the soil erodes away, by washing or blowing, not only precious soil is lost but also many, many valuable pounds of plant food. The amount of topsoil remaining to be farmed is very important in determining the practices needed to conserve the land.

Depth of topsoil can be measured by digging into the surface soil or observing the furrow slice behind the plow. A convenient grouping of erosion classes could be made as follows:

No Apparent Erosion — Nearly all the original topsoil remains and there is no apparent evidence of erosion.

Moderate Erosion — Top 6 or 7 inches is mostly topsoil, occasional subsoil spots exposed on the field.

Severe Erosion — Top 6 or 7 inches is mixed topsoil and subsoil, numerous subsoil spots exposed on the field.

Very Severe Erosion—Topsoil is nearly all gone and the top 6 or 7 inches is mostly subsoil.

Very Severely Gullied — Topsoil nearly all gone and numerous gullies occur on the field.

Loss of topsoil is a serious handicap to the land. Yields of most crops drop in proportion to the amount of topsoil eroded away.

Serious erosion resulting from one rain on unprotected slope. Correct conservation program would have prevented this loss.

CLASSIFYING LAND ACCORDING TO ITS CAPABILITY

After studying and appraising the different land features, we still have not arrived at the place where we can say how a field should be used and what treatment it needs to keep it good permanently. We need a measuring stick that will enable us to consider all of these land features in one bundle — to judge each different combination of land features so that the field can be studied and treated as a unit.

After many years' experience in working with thousands of farmers throughout the United States, the Soil Conservation Service devised the land capability classification to fill this need. This system makes use of all the information about the land now known to be significant — including the features we have just described. It gives a quick, easily understood picture of the land's capability for use — crops, trees, grass or wildlife. Each piece of land is good for something and probably better suited to some one use than to any other. On the basis of the physical land features it may be decided that a given piece of land is either best suited for cultivated crops, pasture, trees, wildlife, recreation, or perhaps just scenery.

Thus, land judging also includes classifying the land according to the use it is best suited for and the treatment it needs.

There are eight of these land capability classes, each class having the same meaning in all parts of the United States.

Cropland vs. Non-cropland

To begin with, all land is separated into two broad groups: (1) land suited for cropland, and (2) land suited only for permanent vegetation. Each of these is subdivided into four parts. The four subdivisions indicate the intensity of the land hazards present under each type of use.

Classes I, II and III include all land that is suited for regular cultivation, and Class IV the land that can be safely cultivated only occasionally, that is, in a limited way. Classes V, VI and VII include the land that is not suited for cultivation but is suited for pasture and woodland. Class VIII is the land that is not suited for cultivation, pasture or woodland. Some of it is good for wildlife, some is valuable for watershed protection, and some of it is good for recreation.

These classes are designated by different colors on maps furnished to farmers in soil conservation districts throughout the nation. The colors are standard throughout the nation and help farmers easily and quickly interpret the information on the land capability maps.

Definitions of the Land Capability Classes

Here are descriptions of the eight land capability classes:

Class I is very good land from all points of view. It is nearly level and does not wash or blow readily.

Here is land that meets all the specifications. It is deep, dark, medium textured, well drained and nearly level. This is Class I land.

The soil is deep and easy to work. It holds water well and is at least fairly well supplied with plant nutrients. You can use it safely in almost any way you choose. Of course, it should be managed so that a good supply of plant nutrients and good physical conditions are maintained. This class is designated on a land capability map by a green color.

Class II is good land from every standpoint, but certain physical conditions make it not quite so good as Class I. The slope may be just enough to create an erosion hazard. Some Class II land is naturally wet and drains slowly. Some has not quite as good water-holding capacity as Class I land and is slightly droughty. Each of these deficiencies either limits the use of the land to some extent or requires some special attention year after year. This class is colored yellow on the map.

Since Class II land has some moderate, natural use limitation, some special treatment is called for, such as easily applied conservation practices like contouring, cover crops, simple water management, crop rotations, and the use of fertilizers.

Class III is moderately good land for cultivation. It is more limited in use than Class II land by reason of one or more natural features. It can be used regularly for crops but, because of these natural restrictions, intensive treatment of some kind is called for. Some Class III land is moderately sloping and must have intensive use of erosion-control practices to control erosion if cropped in a regular rotation. Another variation of Class III land is that which may be poorly drained and requires drainage. All Class III land is colored red on the map.

Class IV land is good enough for occasional cultivation under careful management, but it is not suited for regular production of cultivated crops. A large part of it is too steep for regular cultivation primarily because of the danger of erosion. Some may be flat, sandy lands which are droughty. Generally speaking, it can be cultivated safely, perhaps one year in six; in the other years its best use is for pasture or hay. This class is indicated by a blue color.

Class V land is nearly level and not subject to erosion. Because of wetness, climate, or some permanent obstruction like stones and boulders, it is not suited for cultivation. The soil is deep, however, and the land has few limitations of any kind for grazing or for forestry use. This class is left uncolored on the map.

Class VI land is not suitable for any cultivation, and it is limited somewhat for grazing or forestry by such features as shallow soil, steep slopes, or excessive stream bank cutting that cannot be corrected to permit use for crops. This class is designated by an orange color.

Class VII land is not only unsuited for cultivation but has severe limitations for use for grazing or for forestry. It requires extreme care to prevent erosion. In rough areas its use for either grazing or woodland requires special care. A brown color designates this class.

Class VIII land is suited only for wildlife or recreation purposes. Usually it is extremely dry, rough, steep, stony, sandy, wet, or severely eroded. Class VIII land is colored purple when a colored map is made.

A moderate erosion hazard but otherwise favorable features makes this land Class II.

Steeper slopes with accompanying erosion hazard makes this land Class III.

Steeper slopes and shallow soil put this land at the borderline of cultivable land — it is Class IV — suited only for limited or occasional cultivation.

Here is land that is deep, productive and has no erosion hazard. Yet it is wet and cannot be drained for the growing of cultivated crops. It is Class V, not suitable for cultivation.

Steep slopes and shallow soil create hazards that make necessary careful use even for pasture. This is Class VI land.

An example of using land beyond its capability. Removal of trees from this steep land for more pasture is starting gullies. This is Class VII — suited for trees with utmost care and management.

Marsh land not suited for cultivated crops, pasture or woods because of unsurmountable hazards. Class VIII, suitable for wildlife.

PRACTICES TO FIT THE LAND

The fact-gathering part of a conservation program, which involves getting the strong land features and the weak land features well in mind and getting the capabilities of the land in each field well in mind, is the first step. The next step, and probably of equal importance, is selecting the treatments necessary to fit the needs of the land. Judging the land, then, may be considered as (1) taking inventory of the land on the farm; (2) designating the land use, and (3) selecting the supporting conservation practices needed. These last two are the first steps in the planning process.

Proper Land Use

The selection of the land use for each piece of land is the first and one of the most important decisions to be made in planning a conservation program.

The success of all other phases of the conservation program on the farm will depend on the judgment used in making this decision.

Selecting the proper land use for each field is a matter of deciding whether the field is suited for cropland, for pasture land, for woodland, or for wildlife or recreation. To do this requires proper evaluation of the physical land features that have been described, and determining the land capability classification. This classification may indicate that the use of some lands may be limited to permanent vegetation. It does not indicate, however, that permanent vegetation is not desirable on land classed as cropland. The use selected for each piece of land will depend not only on the physical land conditions but on the type of farming and the desires of the farmer. Wise soil conservation planning includes selecting a use for land that it is capable of supporting.

The land capability classes have already been described but the following suggestion may help in determining the land use for a given area:

Land capability classes I to IV are considered suitable for growing farm crops and therefore suitable for different intensity of cultivation. Land conditions which have no cropland hazards, or hazards that can be overcome or compensated for by modern conservation methods, would be classified in land capability classes I, II, III or IV and can be used safely for cropland. This assumes that the practices necessary to overcome the hazards will be used. If such practices are not used, then a pasture, woodland or wildlife type of use will be necessary. Some Class IV land has such hazards or combination of hazards that the usual conservation practices cannot be applied. It is, therefore, used only occasionally for crops that require working the soil such as would be needed for re-establishing the grass and legumes.

To use any of the other classes (V, VI, VII or VIII) for cultivation is not good conservation. The very nature of the land in these classes indicates the need for protection by permanent vegetation.

A pasture, woodland or wildlife type of use is safe on all classes from I through VII. The decision as to whether the land is to be used for grass or trees may depend somewhat on the needs and desires of the farmer. Either type of use is generally favorable to the land if proper supporting and management practices are used. Some extremely stony lands or extremely steep or eroded lands are suited to tree-type vegetation simply because only the tree-type vegetation is able to thrive under these circumstances.

Wildlife or recreation is the only type of use that, if properly managed, is safe on all classes of land. It is usually the only type of use that can be applied safely on Class VIII land.

Cropping Systems

Cropping systems, as used here, means the specific crop or plant, or sequence of crops or plants, that will be grown on the land. It includes tree or grass crops on land not suitable for cultivation as well as crop rotations on land suitable for cultivation.

If cultivation is the use selected for a piece of land, then the order or sequence of crops becomes very important.

A crop rotation is a conservation practice essential on all cultivated land. A crop rotation refers to the number and sequence of clean tilled, grain and sod or meadow crops over a period of years. For example, a row crop-small grain-meadow-meadow (R-G-M-M) rotation is a 4-year system with cultivated crops one-fourth of the time and a meadow crop one-half of the time.

In general, the more intensive the hazard or combination of hazards in a field, the greater the percentage of time the field should be in a meadow or soil conserving crop. Class II demands, normally, a less intensive cropping system than does Class I, and Class III less than Class II, etc. If the hazard is one that can be entirely overcome by some supporting conservation practice, such as contour tillage, then the same cropping system may be equally effective on two different classes of land. Meadow crops, including grass and legume mixtures in the meadow years, are recognized as soil conserving crops whether the land hazard be erosion, excess wetness, droughtiness, slope, or limited organic matter content and fertility.

Many combinations of crops in cropping systems may be used in a soil conservation program; the selection varies with land condition, type of farming, choice of farmer, seasonable weather and other similar factors. For general purposes of judging or selecting cropping systems for cultivated land all rotations

can be grouped into four cropping systems:

An intensive cropping system which includes a row crop, such as corn or beans, one-half of the time or more and a meadow crop one-half of the time, or less. An example is, a 4-year rotation of corn-corn-small grain-meadow, which can normally be safely used on Class I lands.

A moderate to intensive cropping system which includes row crops from one-third to one-half of the time in the rotation and meadow or sod crops the remainder of the time. An example of this type of cropping system is a 3-year rotation of corn-small grain-meadow, usually considered satisfactory on Class II land.

A moderate cropping system which includes meadow crops one-half of the time or more and row crops less than one-fourth of the time. A 4-year rotation of corn-small grain-meadow-meadow is an example of a moderate cropping system suitable for use on Class III land.

Occasional or extensive cropping, or a cropping system where plowing is held to a minimum and row crops are not included in the rotation. An example of this type of cropping system would be a rotation of small grain followed by three or four years of meadow before plowing again. Such a cropping system is successfully used on Class IV land.

If the land use selected is of a permanent type, either grass, trees, or wildlife, then a selection of type of grass, trees or shrubs and their proper management is necessary.

Grassland, woodland or wildlife with ordinary management and no special practices can be used safely on lands of capability Class V.

Grassland, woodland or wildlife use with some special practices such as limited grazing or more than the usual care in timber cutting and wildlife protection are usually needed on land classified as Class VI.

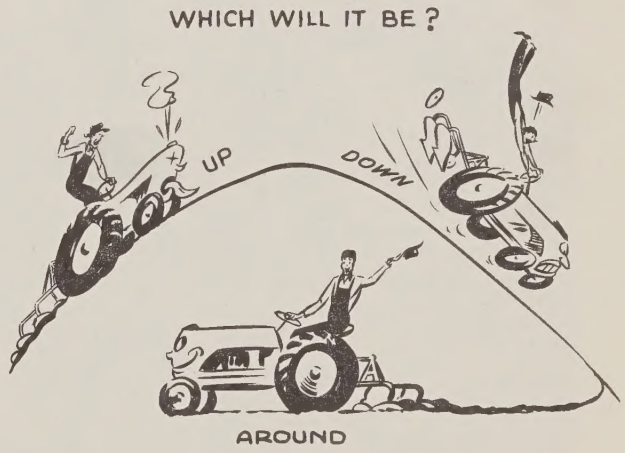
Woodland, grassland or wildlife use with very careful management such as very limited grazing or strict regulation of cutting to overcome or compensate for the more serious hazards are advisable on Class VII land.

Wildlife or recreational use is the most intensive system of management that should be considered for Class VIII land.

Supporting Conservation Practices

Land uses and cropping systems classified on a soil conserving and soil depleting basis should be considered only in combination with other supporting conservation practices designed to overcome or lessen special land hazards. Some such supporting practices are:

1. Contour farming with or without strip cropping.
2. The plowing under of meadow crops for green manure.
3. Terraces with adequate outlets plus contour farming.
4. Surface drainage.
5. Tillage operations parallel to field fences with no exact contouring.
6. Pasture improvement.
7. Limited or controlled grazing.
8. Lime and fertilize according to soil tests.
9. Diversion terraces with adequate outlets.
10. Timberland management.
11. Restricted cutting.
12. The provision for food, cover and water in wildlife areas.
13. Strip cropping with contour cultivation.



The basis of farm conservation planning to fit the needs of the land is selecting the proper combination of land use, crop sequence and supporting practices. This selection is a matter of judgment based on the land conditions, the nature of the hazard, the type of farming, the preference of the farmer, the economic situation and many other factors. For example, let us assume that all of the land features in a given field are favorable except that the field has a gentle slope. Such a field could be used for permanent vegetation with no supporting practices other than providing an adequate plant nutrient supply. It could likewise be used for moderate to intensive cropping provided the hazard of slope and possibility of erosion was remedied by a supporting practice such as terracing. It likewise could be used without terracing provided the cropping system included sufficient amounts of meadow crops and the field was farmed on the contour.

No exact combination of practices and crops can be selected that will fit all fields. Each field is different and must be treated according to its individual needs. For purposes of conducting these phases of a Land and Soil Conservation Judging contest, however, several possibilities are indicated on the score card and the judging technique, like livestock judging, is to compare your judgment with that of an experienced conservationist.

This score card was used in one of the first Land and Soil Conservation Judging contests held. The wording of such a score card might vary between different areas. It consists of five different parts which cover the major thinking processes needed in planning for soil conservation.

These parts are:

1. Judging the physical features of the land.
2. Indicating the land capability classification.
3. Selecting the appropriate land use for the field.
4. Suggesting the most intensive but safe cropping system.
5. Selecting other appropriate supporting conservation practices.

SCORING

Total Possible Points — 100

PART 1 — Total points 36
Credit 6 points each correct answer (one answer per column)
Credit 0 points for each incorrect answer

PART 2 — Total points 12
Credit 12 points for correct answer
Credit 6 points for miss by one class
Credit 0 points for miss by more than one class

PART 3 — Total points 12
Credit 12 points for correct answer
Credit 0 points for incorrect answer

PART 4 — Total points 20
Credit 20 points each correct answer
Credit 10 points each near miss
Credit 0 points each miss

PART 5 — Total points 20
It will be necessary for the judging committee to determine which items apply. The potential score of 20 will be divided by the number of items which apply to give the score for each. To furnish penalty for guessing a deduction should be made for each item marked that does not apply.

Some suggestions for conducting a judging activity:

1. Preparation of two or more land sites. Profile exposures should be dug at least 40 inches deep, if possible, and of sufficient length to accommodate the contestants. One side of the excavation should be perpendicular to permit a good view of the profile.

2. Surface soil and subsoil from the site should be piled separately to enable contestants to examine the soil without damaging the prepared profile.

3. The site for the profile cut should be located near the center of a uniform and representative area that can be judged as a field on which the slope, erosion and needed soil conservation practices are to be determined.

4. A separate score card should be used for each site.

5. Written reasons should be prepared by the official judges and made available to the contestants and their instructors after the contest.

SAMPLE SCORE CARD
For
LAND AND SOIL CONSERVATION JUDGING

Name ..... School ..... Plot No. .....

PART ONE — Physical Features of the Land
Check one description per column. **Potential Score 36** **Score** ____

COLOR of Surface Soil — 6 Points	DEPTH of Surface and Subsoil Favorable for Root Growth — 6 Points	EASE OF AIR AND WATER MOVEMENT in the Subsoil — 6 Points	TEXTURE of Surface Soil — 6 Points	SLOPE Steepness — 6 Points	EROSION Degree of — 6 Points
DARK Black or dark brown	**DEEP** 36 inches or more favorable to root development and growth	**MODERATE** Bright, uniform colored, open and porous throughtout the subsoil	**MEDIUM** Loam or silt loam — smooth feel, can be molded	**NEARLY LEVEL** 0-2 ft. fall in 100 ft.	**NO APPARENT** 10 inches good surface soil remaining
				GENTLY SLOPING 2-5 ft. fall in 100 ft.	**MODERATE** Top 6-7 inches is mostly surface soil
MODERATELY DARK Dark gray, grayish brown or light brown	**MODERATELY DEEP** 20 to 36 inches of favorable soil over a very unfavorable layer	**MODERATELY SLOW** Bright, uniform colored, porous upper subsoil — lower subsoil dull colored gray or mottled	**LIGHT** Sandy loam or gravelly loam — has a gritty feel — mold can be easily broken	**MODERATELY SLOPING** 5-9 ft. fall in 100 ft.	**SEVERE** Top 6-7 inches is mixed surface soil and subsoil
		SLOW Entire subsoil is dull colored, gray and mottled, usually heavy	**HEAVY** Clay loam or clay (gumbo). Feels sticky when wet	**STRONGLY SLOPING** 9-14 ft. fall in 100 ft.	**VERY SEVERE** Surface nearly gone — top 6-7 inches is mostly subsoil
LIGHT Gray or light gray	**SHALLOW** 20 inches or less to hardpan, claypan, rock, sand, etc.	**VERY SLOW** Gray layer in surface soil and a heavy, gray, dull colored subsoil	**VERY LIGHT** Very sandy or very gravelly — no stickiness even when wet	**STEEP** 14-20 ft. fall in 100 ft.	**VERY SEVERELY GULLIED** Surface gone — badly gullied
				VERY STEEP 20 ft. and over	

PART TWO — Land Capability Classification
Check one class for the field examined. **Potential Score 12** **Score** ____

LAND SUITED FOR CULTIVATION				LAND SUITED ONLY FOR PERMANENT VEGETATION			
Class I	**Class II**	**Class III**	**Class IV**	**Class V**	**Class VI**	**Class VII**	**Class VIII**
No special hazards	Some hazards easy to overcome	Severe hazards requiring much treatment	Very severe hazards best overcome by hay or meadow use	Few limitations for permanent vegetation	Moderate limitations for permanent vegetation	Severe limitations for permanent vegetation	No productive vegetation

PART THREE — Select Appropriate Land Use for field
Potential Score 12 **Score** ____

Cropland	Hay or Meadow	Pasture Land	Timber Land	Wildlife or Recreation

PART FOUR — Suggested cropping system, with ordinary good farming methods.
Check one of the following as your recommendation for handling this land:
Potential Score 20 **Score** ____

_____Permanent vegetation; simple conservation practices are needed.
_____Intensive cropping including a row crop one-half of the time.
_____Permanent vegetation; serious hazards to be overcome by special conservation practices.
_____Moderate to intensive cropping; row crops one-third to one-half of the time.
_____Moderate cropping; row crop not more than one-quarter of the time.
_____Wildlife or recreation; adequate good management.
_____Occasional cultivation; plow no more than once in 5 or 6 years.
_____Permanent vegetation; no special conservation practices needed.

PART FIVE — Other Suggested Conservation Practices
Check one or more as appropriate.
Potential Score 20 **Score** ____

_____Terrace with adequate outlets plus contour farming.
_____Tillage operations with field boundaries without exact contouring.
_____Surface drainage.
_____Plow under deep rooted legumes for green manure.
_____Pasture improvement.
_____Diversions with adequate waterways.
_____Wildlife area — provide food, cover, water.
_____Strip cropping with contour cultivation.
_____Lime and fertilizer according to tests.
_____Timberland management.
_____Contour farming with or without strip cropping.

FINAL SCORE ____

After a land judging activity, a discussion by an experienced soil conservationist will help to nail down the points covered.

U.S.D.A., Soil Conservation Service, Milwaukee, 1952